The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOSEPH F. LOPRETE,
JOHN R. WILLIAMS, JOE T. HILL,
and GENE M. FIELDS

Appeal No. 2001-0705
Application 09/090,358

ON BRIEF

Before COHEN, MCQUADE, and BAHR, Administrative Patent Judges.

MCQUADE, Administrative Patent Judge.

DECISION ON APPEAL

Joseph F. Loprete et al. appeal from the final rejection of claims 1 through 7, 12 through 14 and 16 through 20. Claims 8 and 15 stand objected to as depending from a rejected base claim, and claims 9 through 11, the only other clams pending in the application, stand withdrawn from consideration pursuant to 37 CFR § 1.142(b).

THE INVENTION

The invention relates to "a scroll compressor with a drive providing capacity modulation by reverse rotation of the motor" (specification, page 1). Representative claims 1 and 17 read as follows:

1. A scroll compressor comprising:
a first scroll;
a second scroll being driven for orbital movement relative to said first scroll;
a reversible electric motor, said motor being operable to be driven in one direction at a first speed of rotation and cause said orbiting scroll to cyclically orbit in a forward direction at a first rate which is approximately equal to said first speed, and said motor being operable to be rotated in an opposed direction at said first speed, said orbiting scroll being caused to move in said forward direction when said motor is driven in said opposed direction at a rate which is different from said first rate by a mechanical transmission.

17. A scroll compressor as recited in Claim 1, wherein a one-way clutch connects said rotary motor to said second scroll when said motor is driven in said forward direction, such that said transmission does not affect the speed of movement of said second scroll when said motor is driven in said forward direction, and said one-way clutch allowing relative rotation between said motor and said second scroll member when said motor is driven in said reverse direction such that the drive of said second scroll by said rotary motor passes through said transmission when said motor is driven in said reverse direction.

THE PRIOR ART

The references relied on by the examiner to support the final rejection are:

Sisk et al. (Sisk)	4,137,798	Feb. 6, 1979
Wallis et al. (Wallis)	5,803,716	Sep. 8, 1998

THE REJECTION

Claims 1 through 7, 12 through 14 and 16 through 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sisk in view of Wallis.

Attention is directed to the appellants' main and reply briefs (Paper Nos. 9 and 11) and to the examiner's answer (Paper No. 10) for the respective positions of the appellants and the examiner with regard to the merits of this rejection.

DISCUSSION

I. Grouping of claims

On page 3 in the main brief, the appellants state that the rejection of claims 16 through 20 is separately contested and does not stand or fall with the rejection of the other claims, thereby effectively grouping the appealed claims into two groups: claims 1 through 7 and 12 through 14, and claims 16 through 20. Pursuant to 37 CFR § 1.192(c)(7), we have selected representative claim 1 from the first group and representative claim 17 from the second group and shall decide the appeal on the basis of these claims alone. Claims 2 through 7 and 12 through 14 shall stand or fall with claim 1, and claims 16 and 18 through 20 shall stand or fall with claim 17.

II. The merits of the rejection

Sisk, the examiner's primary reference, discloses a two-speed, heat pump compressor drive apparatus which is said to be more efficient and less costly than a conventional two-speed motor (see column 1, lines 11 through 44). With reference to Figure 1, the apparatus 10 includes a drive shaft 12, a fixed support 19 disposed about the drive shaft 12, a reversible motor 18 for rotating the drive shaft 12 in opposite directions, a driven shaft 14, a sun gear 20 rigidly secured to the drive shaft 12, a planet carrier 24 rotatably mounted on the drive shaft 12, a sprag 23 disposed between the planet carrier 24 and the fixed support 19, an over-running clutch 38 carried by the planet carrier and coupled to the drive shaft 12, a ring gear 40 rigidly secured to the driven shaft 14, and a pair of planetary gears 34 rotatably mounted on the planet carrier 24 and meshing with the sun gear 20 and the ring gear 40. Sisk describes the operation of the drive apparatus as follows:

> [i]n use, apparatus 10 is operated by energizing motor 18 either in one direction or the other. Assuming that the motor is energized to cause rotation of shaft 12 in a clockwise sense when viewing FIGS. 2 and 3, planet carrier 24 is driven clockwise at low speed until clutch 38 connects planet carrier 24 to drive shaft 12. The planet carrier is then locked to the drive shaft and planetary gears 34 rotate as a unit with sun gear 20 in a clockwise sense when viewing FIGS. 2 and 3. This, in turn, causes rotation of ring gear 40 in a clockwise sense when viewing FIGS. 2 and

> 3, there being no relative rotation between the sun, planetary and ring gears inasmuch as they are essentially locked together and rotate at the speed of rotation of drive shaft 12. Driven shaft 14 is rotated with ring gear 40 and operates a heat pump compressor or other means coupled thereto.
>
> When shaft 12 is rotated in a counterclockwise direction by reversing motor 18, planet carrier 24 is driven in a counterclockwise sense until sprag 23 locks the planet carrier to support 19. Thus, the planet carrier can no longer rotate in a counterclockwise sense and shafts 36 of planetary gears 34 remain in fixed position although planetary gears 34 rotate relative to shafts 26 in a clockwise sense when viewing FIGS. 2 and 3 under the influence of sun gear 20. This rotation of the planetary gears causes clockwise rotation of ring gear 40 and thereby driven shaft 14 at a speed equal to the motor speed multiplied by the number of teeth on sun gear 20 divided by the number of teeth on ring gear 40. Thus, regardless of which direction drive shaft 12 rotates, driven shaft 14 will always rotate in the same direction. The speed of rotation of the driven shaft will, of course, be greater when shaft 12 rotates in a clockwise sense [column 3, lines 25 through 58].

As conceded by the examiner (see page 4 in the answer), Sisk does not respond to the limitations in claims 1 and 17 requiring the compressor to be a scroll compressor. In this regard, Sisk does not specify the exact nature of the heat pump compressor to which the foregoing two-speed drive apparatus is connected.

Wallis discloses a scroll machine designed to eliminate reverse rotation problems when used to compress refrigerant in refrigerating, air-conditioning and heat pump systems (see column 1 line 15, through column 2, line 40). According to Wallis,

"[s]croll machines are becoming more and more popular for use as compressors in both refrigeration as well as air conditioning and heat pump applications due primarily to their capability for extremely efficient operation" (column 1, lines 23 through 26). In general, the scroll compressor 10 comprises a motor 28, a motor drive shaft 32 having an eccentric crank pin 34 at the distal end thereof, an orbiting scroll 58 coupled to the eccentric crank pin 34 and having a typical spiral vane or wrap 60, and a non-orbiting scroll member 70 having a wrap in meshing engagement with the wrap 60 on the orbiting scroll 58.

In proposing to combine Sisk and Wallis to reject the appealed claims, the examiner concludes that it would have been obvious

> to modify a heat pump including the two-speed drive apparatus as disclosed by Sisk to include a scroll compressor such as disclosed by Wallis since Wallis teaches that scroll compressors are particularly well suited for heat pump applications, and/or in order to advantageously increase the efficiency of the compressing means disclosed by Sisk [answer, page 4].

The collective teachings of Sisk and Wallis would have provided the artisan with ample suggestion or motivation to so combine these references in order to bring together the above noted, expressly disclosed, efficiency benefits of Sisk's heat pump compressor drive apparatus and Wallis' heat pump scroll

compressor. The appellants' argument (see pages 3 and 4 in the main brief and page 1 in the reply brief) that the proposed combination would not have been obvious because it would result in undesirable reverse rotation of the scroll compressor is completely lacking in merit. As clearly disclosed by Sisk, the output rotation of Sisk's driven shaft 14 is always in the same direction regardless of which direction the motor 18 and drive shaft 12 rotate. It certainly would have been well within the level of ordinary skill in the art to connect Sisk's drive apparatus to Wallis' scroll compressor so as to drive the compressor in the proper direction.

The related arguments (see pages 3 and 4 in the main brief and pages 2 and 3 in the reply brief) that the proposed reference combination does not respond to (1) the limitation in claim 1 requiring the orbiting scroll to cyclically orbit in a forward direction at a speed approximately equal to the speed of the motor and (2) the limitations in claim 17 relating to the operation of the one-way clutch are also unpersuasive. Sisk makes it abundantly clear that when motor 18 rotates in one direction, i.e., a forward direction, the sun, planetary and ring gears 20, 34 and 40, are locked together so as to rotate the driven or output shaft 14 at the speed of rotation of the motor

18 and drive shaft 12. Hence, in the proposed combination of Sisk's compressor drive apparatus and Wallis' scroll compressor, the orbiting scroll would indeed cyclically orbit in a forward direction at a speed equal to the speed of the motor. Furthermore, as is readily apparent from its description, Sisk's over-running clutch 38 is a one-way clutch which would connect the motor 18 to Wallis' second (orbital) scroll when the motor is driven in the forward direction such that the transmission (the locked-up sun, planetary and ring gears 20, 34 and 40) would not affect the speed of movement of the second scroll. Clutch 38 also would allow relative rotation between the motor and the second scroll when the motor is driven in the reverse direction by virtue of the speed reduction resulting from the drive of the second scroll passing through the unlocked transmission. Thus, the proposed combination of Sisk and Wallis responds completely to the clutch and operational limitations set forth in claim 17.

In light of the foregoing, the combined teachings of Sisk and Wallis fully support the examiner's conclusion that the differences between the subject matter recited in claims 1 and 17 and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. This being the case, we

shall sustain the standing 35 U.S.C. § 103(a) rejection of claims 1 and 17, and claims 2 through 7, 12 through 14, 16 and 18 through 20 which stand or fall therewith, as being unpatentable over Sisk in view of Wallis.

SUMMARY

The decision of the examiner to reject claims 1 through 7, 12 through 14 and 16 through 20 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

IRWIN CHARLES COHEN)
Administrative Patent Judge)
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) BOARD OF PATENT
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JOHN P. MCQUADE) APPEALS AND
Administrative Patent Judge)
) INTERFERENCES
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